Introduction to the Winter-run Chinook LCM

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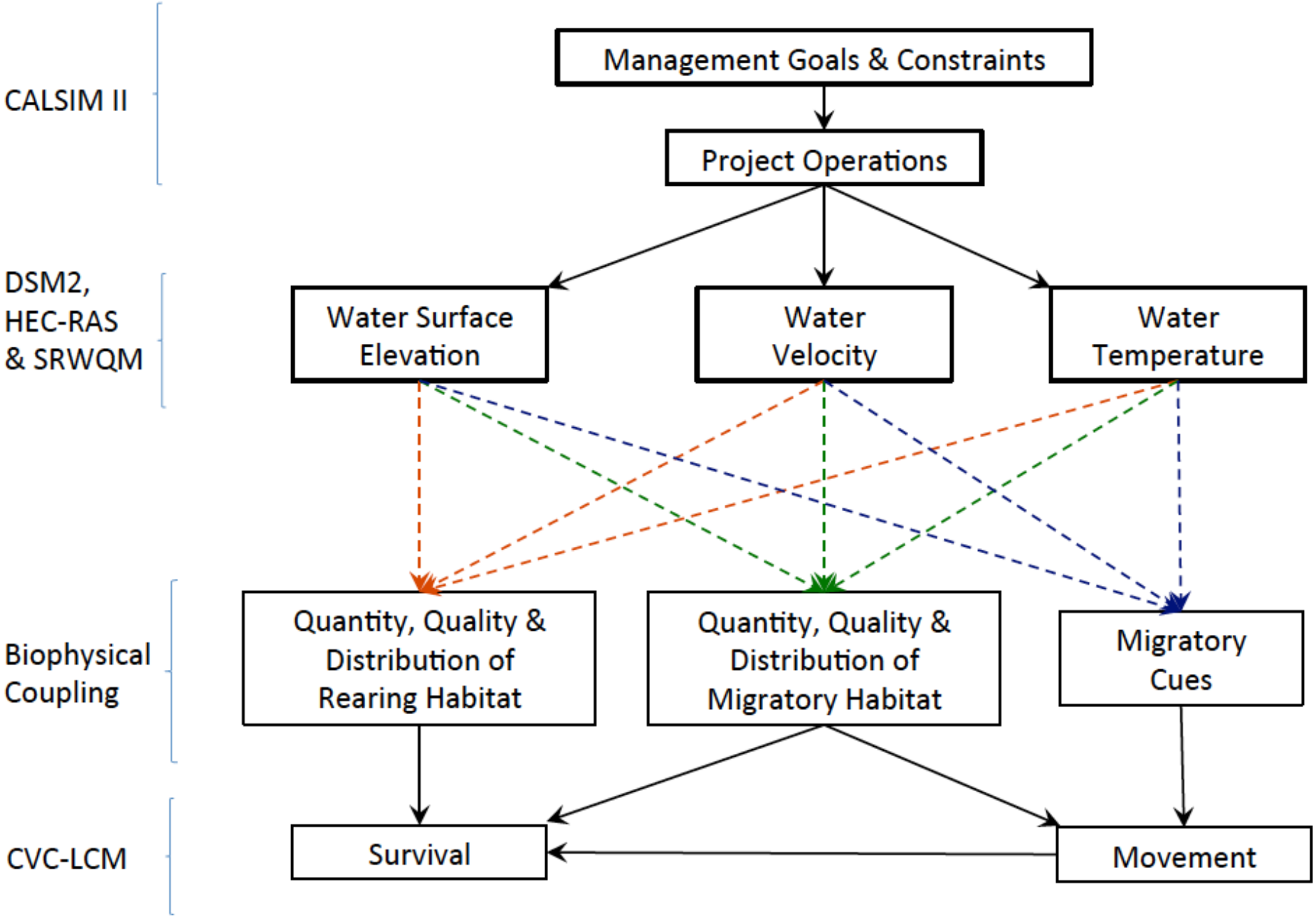
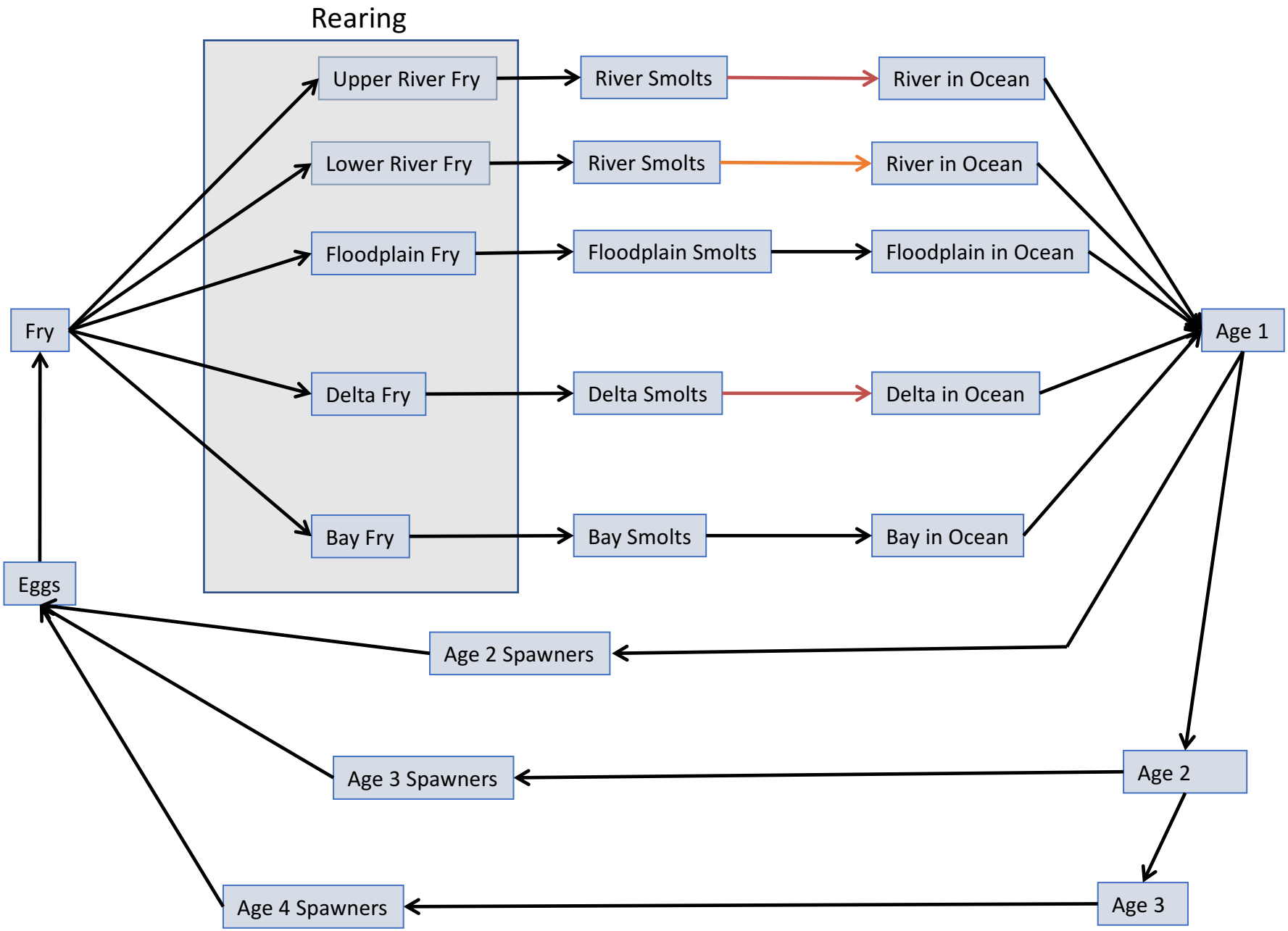

CALSIM II
DSM2, HEC-RAS & SRWQM
Biophysical Coupling
CVC-LCM
Management Goals & Constraints
Project Operations
Water Surface Elevation
Water Velocity
Water Temperature
Quantity, Quality & Distribution of Rearing Habitat
Quantity, Quality & Distribution of Migratory Habitat
Migratory Cues
Survival
Movement


Rearing
Upper River Fry
Lower River Fry
Floodplain Fry
Delta Fry
Bay Fry
River Smolts
River Smolts
Floodplain Smolts
Delta Smolts
Bay Smolts
River in Ocean
River in Ocean
Floodplain in Ocean
Delta in Ocean
Bay in Ocean
Fry
Eggs
Age 1
Age 2 Spawners
Age 3 Spawners
Age 4 Spawners
Age 2
Age 3

Modifications of DSM2-PTM to increase biological realism

Particle Features	DSM2-PTM	ePTM
Swimming behavior	Goes with flow	Selective tidal transport with possible navigation error; diel modulation
Route selection	Proportional to flow	Proportional to flow*
Mortality	Immortal	Survival depends on distance travelled and time

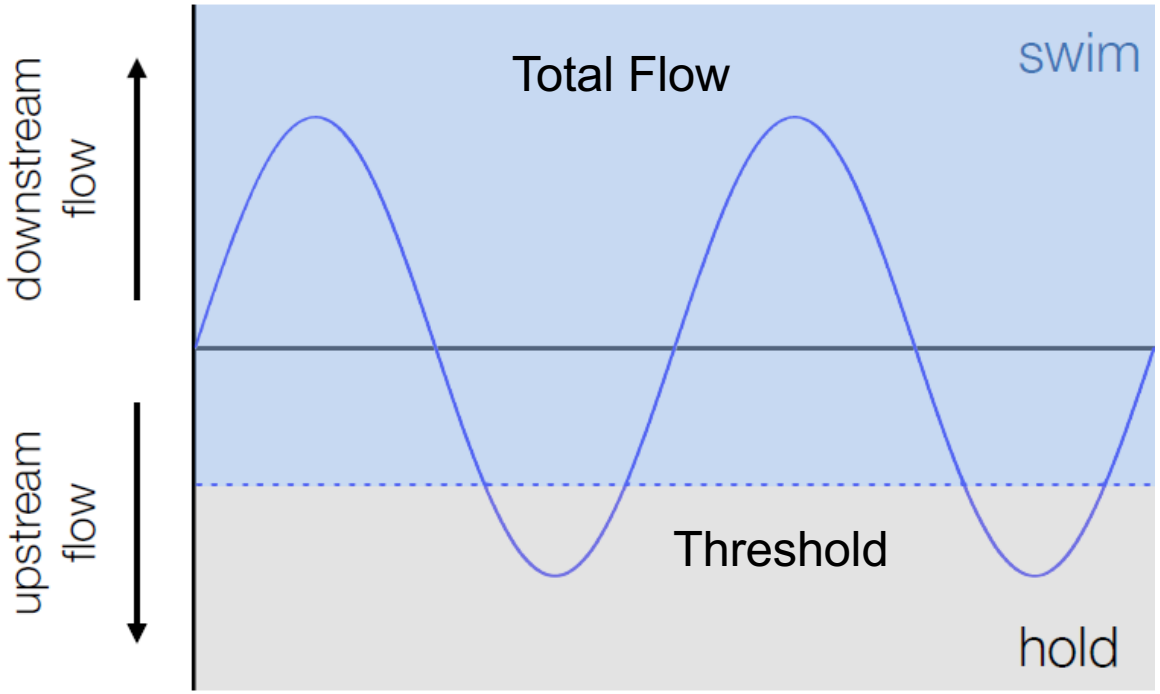
Key parameters:

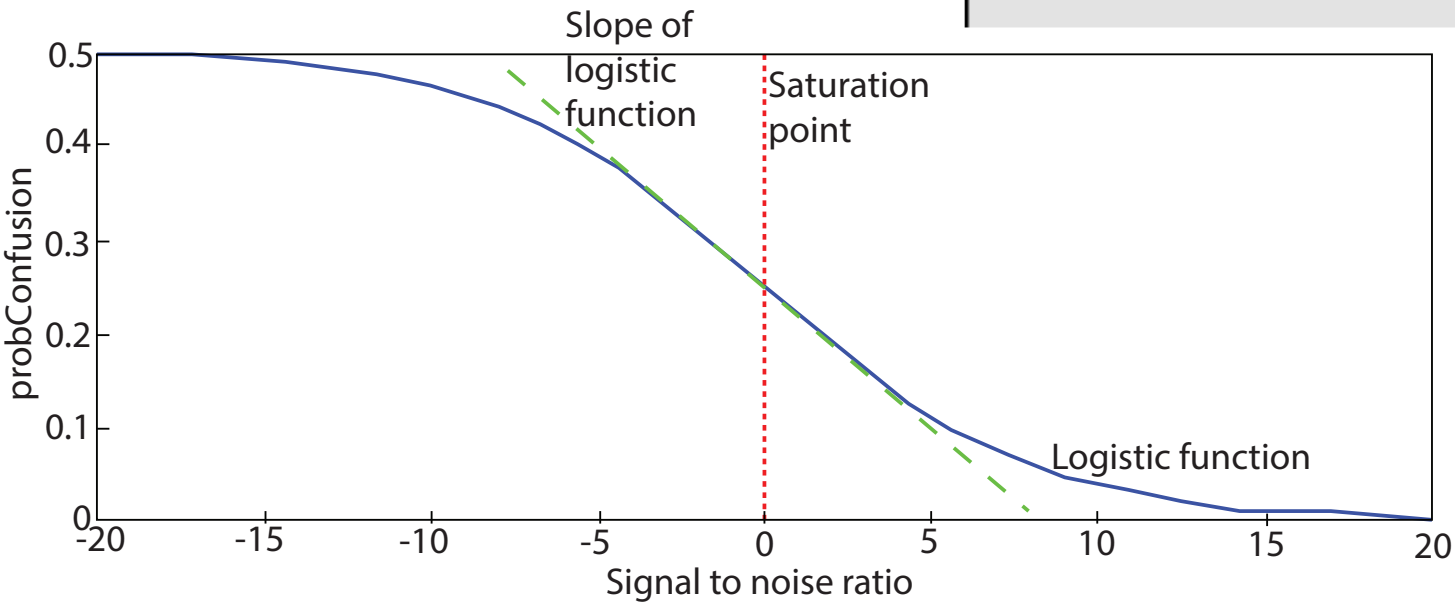
- Predator density
- Predator-prey random velocities
- Swimming speed
- Velocity threshold
- Probability of confusion

Swimming behavior in the estuary

Behavior:

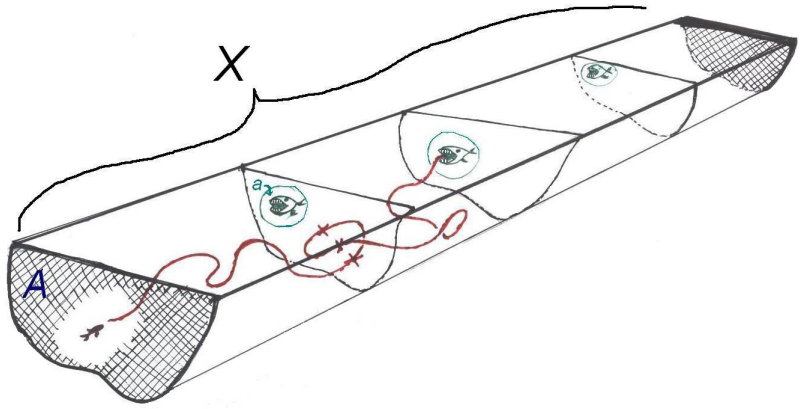
- Swimming speed
- Temporal swimming pattern: selective tidal stream transport & diel activity
- Confusion





Mortality (XT model)

$$S = exp(-\frac{1}{\lambda}\sqrt{x^2 + \omega^2 t^2})$$



- λ = mean free path length of prey
- ω = mean squared random encounter speed of prey and predators
- x = distance
- t = time
- S = prey survival probability

Anderson et al, Ecol Mod 186:196 (2005)

Mark-recapture framework